

# Minnesota State University Moorhead

## BIOL 610: Quantitative Methods in Behavioral Ecology

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 3

Lab Hours/Week: 0

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course is designed to provide a tool kit for testing hypotheses by statistical inference. The course introduces statistical thinking in the application of common univariate methods. Simultaneously, this course introduces core concepts of behavioral ecology and uses biological data sets from common and inexpensive animal systems as the model data for applying statistical methods. Thus, this course will provide students with pre-made examples of engaging hands-on activities to do in the classroom that generate data with which to teach how to apply quantitative methods to test hypotheses.

**B. COURSE EFFECTIVE DATES:** 02/02/2019 - Present

### C. OUTLINE OF MAJOR CONTENT AREAS

1. Quantitative reasoning
2. Visualizing distributions around discrete variables
3. Visualizing continuous variables
4. Mathematical properties of the normal distribution
5. Scientific method and testing hypotheses
6. Introduction to Behavioral Ecology
7. Chi-Square test for association
8. Comparing two independent means using a t-test
9. Comparing two related means using a paired t-test
10. Comparing means from more than two groups
11. Correlation and regression
12. Introduction to sexual selection theory
13. Male-male competition
14. Mating systems
15. Parental care, kin selection
16. Communication and human behavior

### D. LEARNING OUTCOMES (General)

1. Be able to efficiently manage data, move and sort data in MS Excel, display graphs as mean  $\pm$  SE, or scatterplots, and calculate descriptive statistics.
2. Understand the central limit theorem and apply it to hypothesis testing.
3. Apply and interpret the data analysis toolpak in MS Excel to compare frequency data using a chi-square test, two independent means with a t-test, paired means with a paired t-test, three or more means with analysis of variance (ANOVA), factorial ANOVA designs, continuous data with correlation and regression.

**E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

None

**F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

**G. SPECIAL INFORMATION**

None noted